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ABSTRACT

Two major classes of environmental stressors have been examined in life stress research: major life events and minor everyday hassles. To compare these two classes of stressors along with two stressful life events (threatened job loss and reorganization of the work setting), and to investigate the buffering effect of coping responses on stress-related strain, 139 employees of a mental health organization were surveyed. The state-funded organization had been threatened with shut-down and was undergoing a major restructuring in which supervisors, co-workers, and duties were changing. The participants were asked to complete a packet containing seven instruments designed to measure stress, coping, and health. A comparison of the strain scores of these subjects to normative data indicated that they were experiencing considerably high levels of acute strain. A composite index of stress, made up of the three classes of environmental stress, was found to be a better predictor of psychological and physical strain than any of the measures of which it was comprised. Stress and coping had an interactive effect on strain. Coping reduced state anxiety and enhanced general well-being in the high stress group; however, coping had little impact in the low stress group. The findings indicate that adaptive coping behaviors can effectively moderate life stresses. (LLL)

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COPING WITH THE STRESS OF POTENTIAL LAY-OFF AND WORKSITE RE-ORGANIZATION: A TEST OF THE BUFFERING HYPOTHESIS[1]

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Abstract

The first goal of the present study was to compare three approaches to the measurement of environmental stress: 1) major life events; 2) work-related hassles; and 3) two particularly stressful life events -- threatened job loss and re-organization of the work setting. The second goal was to investigate the buffering effect of coping responses on stress-related strain. The subjects were 139 employees of an organization threatened with shut-down and undergoing a major re-structuring in which supervisors, co-workers, and duties were changing. A comparison of the strain scores of these subjects to normative data and scores of similar subjects in other studies indicated that the subjects in the present study were experiencing considerably high levels of acute strain. A composite index of stress, made up of the three classes of environmental stress mentioned above, was found to be a better predictor of psychological and physical strain than any of the measures of which it was comprised. Stress and coping had an interactive effect on strrain in that good coping reduced state anxiety and enhanced general well-being in the high stress group, whereas in the low stress group, good coping had little impact. These findings and the notably high levels of anger of the subjects in the present study were discussed with reference to the stress and coping literature. Limitations of the coping measure used were also noted, in particular the measure's inability to assess coping with anger and frustration.

Coping with the Stress of Potential Lay-off and Worksite Re-organization: A test of the Buffering Hypothesis

The impact of life stress on illness has been well-documented. Hundreds of studies have found a direct, though modest, relationship between the amount of life stress that has recently been experienced and the development of a variety of physical and psychological symptoms (cf. Dohrenwend & Dohrenwend, 1974; 1981; Goldberger & Breznitz, 1982; Rabkin & Struening, 1976).

Two major classes of environmental stressors have been examined in life stress research: major noteworthy life events and minor everyday hassles. Adolf Meyer (1948) was one of the first to emphasize the important influence that major life changes can have on health, such as births, changes in residence, marriage and the death of loved ones. Holmes, Rahe and their colleagues drew on Meyer's practical psychiatry in their studies of the relationship between stressful life events and illness. In a series of experiments, Holmes and Rahe found significant relationships between the number of situations encountered during a given time period that require a substantial change in some aspect of life and the number of illnesses experienced during that same period (e.g. Holmes & Rahe, 1967).

Other researchers have criticized the theory that change itself has an important impact on health, believing instead that only life

events which are unpleasant, unscheduled, and uncontrollable are detrimental to health (e.g., Pearlin, 1982).

Irrespective of the particular nature of the events assessed, the methodology of measuring environmental stress through checklists of major life events has been seriously criticized. Kasl (1983) has argued that a number of factors combine to limit the value of this type of life event research in determining causal relationships between stressors and illness. Among the limiting factors are retrospective bias in the self-report of life events and the likelihood that individual differences influence the impact and number of events experienced. Kasl recommended that future research investigating the causal influence of stressful life events on health and illness do so with a homogeneous group of subjects who are all experiencing the same uncontrollable, stressful event. In this way, the harmful effect of a single stressful event will be ascertained, and over the course of a series of such studies, the harmful effects of a variety of life events can be learned. Research of this type has documented the strong deleterious effect of experiencing such events as: combat (Blank, 1982; Swank, 1949); floods (Bennet, 1970); hurricanes (Erickson, 1976); terrorist acts (Bastiaans, 1982); comprehensive exams (Mechanic, 1962); immigration (Roskies, Miranda & Strobel, 1977); being trapped in a mine (Ploeger, 1977); being a prisoner of war (Ford, 1975); and losing one's job due to economic conditions (Kasl & Cobb, 1982).

Minor daily hassles

Another theory of environmental stress holds that since major life events occur so seldom, their impact on health is minimal. Most of the environmental stressors with which people must contend are not rare, dramatic events, but are instead thought to be the small, relatively minor pressures that emerge in daily transactions. Two approaches have been used to measure these daily irritations. One assesses various common frustrations and aggravations that are drawn from all contexts of life. Kanner, Coyne, Schaefer & Lazarus (1981) developed the Hassles scale for this purpose, and it has been used in two studies. In the first study Kanner et al. compared the Hassles Scale to the Holmes and Rahe (1967) Social Readjustment Rating Scale. These investigators found that the Hassles scale predicted concurrent and subsequent psychological symptoms better than the life event scale. In the second study, the Hassles scale was found to be significantly stronger than the life events scale in predicting somatic symptoms (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982).

While the Hassles Scale assesses irritations across many life contexts, another line of research has examined the day-to-day strains and burdens that emerge in particular social or physical contexts. In the social sphere, examples include marital and parental pressures (e.g., Menaghan, 1982; Pearlin & Schooler, 1978); work overload and underload (Frankenhauser & Gardell, 1976); and job-related tension (Kahn, Wolfe, Quinn, & Snoek, 1964). Examples from the physical

environment include noise (Glass & Singer, 1972); pollution (Evans, Jacobs, & Frazer, 1980, cited in Kanner et al., 1981); and commuting in rush hour traffic (Novaco, Stokols, Campbell, & Stokols, 1979). Preliminary evidence that this method represents an improvement over the stressful life event methodology can be found in Pearlin & Schooler's (1978) findings that the strains that come from being a parent, spouse, job holder, or breadwinner correlate between -.47 to -.62 with emotional well-being. This contrasts to the typical relationship of .2 to .3 usually obtained between major life events and symptoms (Rabkin & Struening, 1976).

While the Kanner et al. (1981) and DeLongis et al. (1982) research examined two classes of stressor measures, hassles and life events, more than two stressor classes have not been compared. The first goal of the present study was to compare the three following approaches to the measurement of environmental stress: (1) a checklist of major stressful life events; (2) work related hassles; and (3) two particular unpleasant, unscheduled, and uncontrollable life events--threatened job loss and a major reorganization of the work setting.

The second goal of the present study was to investigate the buffering effect of coping responses. Coping, or responding in an adaptive way when faced with a stressful event or situation, has been found to be an effective moderating variable in stress research. Using a checklist of life events as the index of environmental stress,

Billings and Moos (1981) found that coping moderated the effects of stress on depression, anxiety and physical symptoms. In studies of particular cataclysmic events, coping behaviors have been found to lessen the adverse psychological effects of hurricane flooding (Anderson, 1976); job disruptions (Pearlin, Managhan, Lieberman & Mullan, 1981); and cancer (Weisman & Worden, 1976-77). Coping behaviors have also been found to be a buffer of the harmful effects of hassles emanating from a variety of contexts, including the work setting (Ilfeld, 1980; Pearlin & Schooler, 1978); and social conditions (Beutell & Greenhaus, 1983; Dressler, 1980; Hall, 1972). Finally coping behavior has been found to moderate the chronic stress of living in the Three Mile Island community following the nuclear power accident (Collins, Baum & Singer, 1983). Based on these findings, it was expected that a buffering effect due to coping would be found in this study. That is, under conditions of high stress, individuals with strong coping skills would report less physical and psychological strain than people with poor coping skills. However, under low stress conditions, coping abilities would not affect strain.

Method

Subjects

This study was conducted at a state-funded mental health research, training and service organization. In December of 1981, the Governor of Florida in his budget recommendations for the coming fiscal

year, proposed to close the organization, eliminating all of its jobs. Over the next few months there was a major effort to put the organization back into the legislative budget, and by June, 1982, this had been accomplished. In March, 1982 a reorganization of this setting was implemented which resulted in most of the employees being assigned either different supervisors, office space, and/or work responsibilities.

Subjects (Ss) for this study were day and evening shift employees in the health services, adult, children, aging, research and training divisions. Other departments including the business office, food service, housekeeping and maintenance, did not participate in this study because they were not directly affected by the reorganization. Of the 162 employees whose participation was requested, 139 agreed to participate, constituting an 86% participation rate.

Descriptive characteristics of the 139 Ss are presented in Table 1. The sample consisted of 68% females and 32% males, ranging in age from 22 to 71 with a mean age of 35. Slightly less than half of the Ss were married, nearly two-thirds had bachelor's or advanced college degrees and most had been working for the organization for between one and five years.

Insert Table 1 about here

Measures

Stressors. The Life Events Questionnaire, short form (LEQ; Horowitz, Schaefer, Hiroto, Wilner & Levin, 1977) is a 38-item life event checklist in which item weights were determined on the basis of both the seriousness of an event and the event's recency. This measure was chosen for use based on the results of a study by Kale & Stenmark (1983), which found the LEQ to be a better predictor of psychological symptoms than three other widely used event checklists.

The Job-Related Tension Index (JRT; Kahn, Wolfe, Quinn & Snoek, 1964) was chosen to measure job-related hassles. It is a 14-item index sampling worker-environment fit, work overload, interpersonal difficulties at work, and either too few or too many job responsibilities. This measure appears to be the one most often used in studies of stress in the workplace (Indik, Seashore & Slesinger, 1964; Lyons, 1971; Schuler, Aldig & Brief, 1977). It has been used with workers in a variety of settings; notably for the present study, with state employees (DeCotiis & Gryski, 1981) and psychiatric staff (Bedeian, Armenakis & Curran, 1981).

Threat and Frustration. Two questions were included to assess the degree of threat and frustration perceived by the subjects as a result of the potential lay-off and reorganization. These were included based on Lazarus' (1966) theory that the predominant intra-individual factor in the amount of stress elicited in a given

situation is determined by the way in which that situation is appraised.

Coping. The Self-Control Schedule (SCS; Rosenbaum, 1980) was used to measure coping in the present study. According to the originator of the SCS, the items were "derived from the growing literature on the nature of stress-handling methods... and from the various coping skills therapies..." (p.110). Rosenbaum further states that the items fall into the following categories of coping behavior: "(1) use of cognitions and self-statements to control emotional and physiological responses; (2) the application of problem-solving strategies...; (3) the ability to delay immediate gratification; and (4) perceived self-efficacy" (p. 110-111).

Strains. The state and trait anxiety and anger scales of the State-Trait Personality Inventory (STPI; Spielberger, Jacobs, Crane, Russell, Westberry, Barker, Johnson, Knight & Marks, 1979) are ten item scales which assess anxiety and anger as acute emotional states and more enduring personality traits. The trait scales were used in the present study as criteria against which the state scores were compared, i.e., for both anxiety and anger, state scores that are notably higher than trait scores would be indicative of acute strain.[2]

The General Well-Being Schedule (GWB; Dupuy, 1973) is an 18 item instrument which measures overall psychological health. Questions are posed to the respondent about the extent to which they have been

bothered by various emotional disturbances during the past month. The GWB is commonly used in studies similar to the present study (e.g., Neff, Husaini, & McCorkel, 1980; Mueller, Edwards & Yarvis, 1978).

The Acute Symptom List (ACSL; Manning, Newhouse, & Ware, 1982) is a 27-item scale which assesses the number of acute somatic symptoms experienced in the prior month, for example, a cough without fever, upset stomach, backaches, shortness of breath, headaches, flu or virus, etc. Only 25 of the 27 ACSL items were used in the present study. Two of the items were omitted because they were concerned with symptoms of anxiety and depression which were assessed by other instruments.

Procedure

Two waves of data collection took place. All potential subjects were first informed at an organization-wide general staff meeting that a study examining stress and health would be undertaken and that they would be approached in their particular departments over the next two weeks and asked to participate. During the departmental staff meetings which followed, the study was again broadly described; anonymity of the subjects' responses was emphasized along with the commitment to provide individual feedback to any participant who desired it. At no time was the specific nature of the study mentioned.

The people who agreed to participate were distributed an informed consent statement which they signed and returned. Then they were given a packet containing an addressed inter-office envelope and the

following instruments: 1) a demographic data sheet, which included the perception of threat and frustration questions; 2) LEQ; 3) JRT; 4) STPI; 5) GWB; 6) ACSL; and 7) SCS. The last six instruments were arranged randomly within each packet. The subjects were asked to complete these measures within one week and to return them in the envelope.

The first wave of data collection took place immediately after the reorganization had been announced and had begun being implemented. This period followed the governor's recommendation for shut-down by approximately four months, but preceded the legislature's re-appropriation.

The second wave of data collection occurred approximately 12 weeks later. By this time the budget re-appropriation was reasonably secure and the reorganization was well along in its implementation. Packets which contained the same instruments that were presented at Time 1, along with a return envelope, were sent to all those from whom consent forms were initially received.

After the data were collected all subjects were notified. About one-third of the sample requested feedback, which was provided between six and 10 weeks after the second testing session.

Results

The results are presented in three sections. In the first section the scores obtained by the participants in this study are compared to findings from prior studies, and the participants who completed the study are compared to those who dropped out. The relationship between the different measures of environmental stress and the four indicators of strain are compared in the second section. In the third section the buffering effects of coping are described.

Characteristics of Participants

Because a control group was not obtained, the mean scores on the stressor, coping, and strain measures of the 139 participants in the present study were compared to scores obtained on these measures in studies with similar samples, or with normative data. The results of the analyses of the stressor measures were examined first, followed by the coping and strain indices. The participants who completed the study, i.e., responded to the test battery at Time Periods 1 and 2, were then compared with the subjects who participated only at Time 1.

Stressors. The means, standard deviations and reliability coefficients for the four stressor measures are presented in Table 2.

Insert Table 2 about here

The alpha of .63 for the Life Event Questionnaire (LEQ) indicates a moderate level of internal consistency for this measure. The mean score of 196.56 on the LEQ was significantly lower than the mean LEQ score of 256.09 reported by Kale & Stenmark (1983) for a sample of 127 adults working in a private industrial firm (t = 3.23, $p < .01$).

The mean Job-Related Tension (JRT) score of 22.43 was lower than the mean JRT score of 26.2 reported by Burke (1976) in a study of 228 engineers and accountants. Since Burke did not report the standard deviation a t-test of the difference was not possible. The alpha for the JRT in the present study was .74, indicating a satisfactory level of internal consistency for this measure.

The threat and frustration scores reported in Table 2 were based on one-item scales for which the possible range of scores was between 1 (very low) and 6 (very high). The mean threat score of 2.94 fell in the lower part of the range; the mean frustration score of 3.54 was in the middle of the range and, relative to threat, appears to reflect a higher level of frustration. However, these measures were developed for the present study, and no comparative data are available.

Coping. The SCS scores of the participants in the present study are compared in Table 2 with findings based on this measures in other studies. The mean score of 42.49 was significantly higher than the mean score of 31.30 reported by Rosenbaum (1980) for a representative sample of 105 Israeli adults (t = 3.97, $p < .001$).

It should be noted that Rosenbaum found no differences between the SCS scores of Israeli and American college students, which were considerably lower than the SCS scores of the participants in the present study. The alpha of .80 for the SCS in the present study indicated moderately high internal consistency.

Strain measures. The mean scores for the strain measures in the present study are reported in Table 3.

Insert Table 3 about here

The mean scores on the STPI trait anxiety and anger scales in the present study of 16.86 and 17.83, respectively, fell near the median for a normative sample of 584 working adults reported in the STPI Preliminary Test Manual (Spielberger et al., 1979). The alphas of .86 for trait anxiety and .72 for trait anger reflected a moderately high level of internal consistency, but were somewhat lower than those reported for the normative sample.

In contrast, the mean state anxiety and state anger scores for the subjects in the present study fell at the 75th and 90th percentiles, respectively, and were significantly higher ($p < .001$) than the average score reported for the normative samples. These findings suggested that the participants in the present study were

average in anxiety and anger proneness, but were feeling acute strain at the time of the study. The alpha coefficients of .90 for state anxiety and .94 for state anger indicated very high internal consistency, and were virtually the same as those reported in the STPI manual (Spielberger et al., 1979).

A further indicator of the acute strain experienced by the subjects in the present study was reflected in the mean score of 73.08 which they obtained on the General Well-Being (GWB) scale. This score was significantly lower than the mean of 80.40 for a random, stratified normative sample of nearly 7000 U.S. adults (Dupuy, 1978) (t = 4.91, $p < .001$). The alpha of .92 for the GWB in the present study was essentially the same as that reported by Dupuy (1978), reflecting very high internal consistency.

The participants in this study obtained a mean score of 3.96 on the Acute Symptoms List (ACSL). Although normative data are not available for the ACSL, the mean number of physical symptoms reported by the participants in this study can be compared to the findings of Frerichs, Aneshensel, Yokopenic & Clarke (1982) for a representative sample of over 1000 adults. These investigators asked their subjects to list and describe any "sicknesses, accidents or injuries which occurred during the past two months" (p. 640); only 4% reported a total of two or more of these events. Thus, the mean number of physical symptoms alone reported by the participants in the present study substantially exceeded the combined number of "sicknesses, accidents

and injuries" reported by Frerichs et al.'s subjects. An alpha of .71 obtained in the present study was indicative of a satisfactory level of internal consistency for this measure.

Drop-outs vs. those who completed the study. Of the 139 subjects who completed the initial testing session, 114 (82%) participated in the second testing session. Among the 25 who dropped out, three terminated employment prior to the second session; the remaining 22 subjects were either on sick leave or vacation during the second testing session or chose voluntarily to end their participation in the study. In order to determine if there were any systematic differences between the subjects who completed the study and those who dropped out, differences between the two groups for each of the stressor, coping and strain measures were evaluated by *t*-tests. The means, standard deviations and *t*-tests values are reported in Table 4. Although no significant differences were found between subjects who dropped out and those who completed the study, there was a tendency for the drop-outs to report higher levels of job stress, higher state anxiety, and more physical symptoms than those who completed the study ($p < .10$).

Insert Table 4 about here

To summarize, the subjects in the present study reported relatively low job and life event stress scores, and very strong coping skills, indicating that perceived environmental pressures were low and interpersonal resources were high. Nevertheless, the high levels on all four strain measures obtained by the subjects in the present study reflected a high degree of emotional arousal and somatic ailments. Moreover, the subjects who failed to complete the study had a slight tendency to report more job stress and acute strain than those who completed the study.

Comparison of Stressor-Strain Correlations Between Different Measures of Environmental Stress.

The stressor-strain relationships between the different measures of environmental stress are compared in the first four rows of Table 5. Stressful life events, job stress and perceived frustration correlated approximately equally with all of the strains, with the exception that frustration was more strongly related to state anger than were the other stressor measures. Perceived threat was very modestly associated with emotional strain and unrelated to well-being or physical symptoms. In order to examine the collective influence of these four stressor measures on strain, the z scores for each subject on each of the four stressor variables were summed. This summed z score was called the Composite Stressor Index (CSI). As reported in Table 5, the relationship between the CSI and each of the strains assessed in the present study were stronger than the relationships between any of the single stressors with the strains.

Insert Table 5 about here

The Effects of Stress and Coping on Psychological and Physical Well-Being

Because the CSI was a more powerful correlate of strain than any of its component measures, it was used as the measure of environmental stress when evaluating coping skills as stress buffer. The median CSI score was used as the basis for assigning subjects to high and low stress groups. Of the 114 subjects who completed the study, 56 subjects with z scores below the median were assigned to the low stress group, and 57 with z scores above the median were assigned to the high stress group. The single subject who scored at the median was placed in the low stress group, thus making the groups equal in size.

The subjects were further divided into good and poor coping groups on the basis of their scores on the Self-Control Schedule (SCS). The 55 subjects who scored below the SCS median score of 42 were assigned to the poor coping group; the 57 subjects with scores greater then 42 were assigned to the good coping group. Two subjects with scores of 42 were assigned to the poor coping group, making the two groups of equal size. To summarize, the 114 subjects were assigned to the following four experimental groups: high stress/good coping (n=28); high stress/poor coping (n=29); low stress/good coping (n=29); and low

stress/poor coping (n=28). One subject in the high stress/good coping group and one in the low stress/good coping group, were subsequently eliminated because of incomplete data.

A 2x2x2 repeated measures, mixed design Analysis of Variance (ANOVA) was used to evaluate the effects of stress and coping on the four strain measures (BMDP; Dixon, 1981). Stress and Coping were the between-subjects factors and Time Periods the within-subjects factor. When significant interactions were found, the simple effects were further evaluated with t-tests. The results of the ANOVAs for each strain measure are reported below.

State anxiety. Table 6 presents the means and standard deviations for the state anxiety scores of the high and low stress and good and poor coping groups. The 2x2x2 ANOVA for these data is summarized in Table 7. The significant Stress x Coping interaction, illustrated in Figure 1, indicated that the poor copers in the high stress group had significantly higher state anxiety than good copers ($t = 2.83$, $p < .01$), whereas the good and poor copers in the low stress group did not differ in state anxiety ($t = .51$, NS). The significant stress main effect reflected the finding that the high stress group was consistently higher in state anxiety than the low stress group, as can be seen in Figure 1. The main effect for coping, while statistically significant, was largely due to the very high state anxiety level of the poor copers in the high stress group.

Insert Tables 6 and 7 and Figure 1 about here

State anger. The mean state anger scores for the high and low stress and coping groups are presented in Table 8. The summary of the ANOVA for these data is presented in Table 7. The poor copers in the high stress group were expected to have higher state anger scores than good copers, while no differences due to coping were expected in the low stress group. The pattern of means reported in Table 8 was consistent with these expectations, but the Stress x Coping interaction was not statistically significant ($p < .20$). However, the Stress and Coping main effects were significant, indicating that the subjects in the high stress group consistently reported higher state anger than those with low stress, and that poor copers reported more state anger than good copers.

Insert Table 8 about here

General well-Being (GWB). The GWB means and standard deviations are presented in Table 9; the 2x2x2 ANOVA is summarized in Table 10. The significant Stress x Coping interaction, which is graphed

in Figure 2, indicated that when stress was high, the subjects with poor coping skills had significantly lower GWB scores than subjects with good coping skills (t = 3.05, p <.01), whereas when stress was low the GWB scores of good and poor copers did not differ (t = .27, NS). Significant main effects were also found for both Stress and Coping. The stress main effect reflected the finding that the subjects in the low stress group had consistently higher GWB scores than those in the high stress group. The coping main effect indicated that good copers had higher GWB scores than poor copers, but as illustrated in Figure 2, this was due mainly to the very low GWB scores for the high stress/poor coping group.

Insert Tables 9 and 10 and Figure 2 about here

Physical symptoms. The mean scores on the Acute Symptom List (ACSL) for the high and low stress and coping groups are presented in Table 11. The results of the ANOVA are summarized in Table 10. Significant main effects were found for both Stress and Coping, indicating that participants in the high stress and the poor coping groups reported more physical symptoms than those in the low stress and good coping groups. The means reported in Table 11 were consistent with

the expectation that poor copers in the high stress group would have greater ACSL scores than good copers, while good and poor copers in the low stress groups would not differ, however the Stress x Coping interaction was not significant.

Insert Table 11 about here

The significant main effect for time periods in this analysis indicated that the mean number of physical symptoms was greater at Time 1 than at Time 2. Since this was the only outcome measure for which a change was observed across time periods, the differences between the Time 1 and Time 2 scores for each of the 25 ACSL symptoms were evaluated by *t*-tests in an effort to clarify this finding. The results revealed that the lower ACSL scores at Time 2 were due almost entirely to a decline in the following four symptoms: a cough, without fever, which lasted for less than a week ($t = 3.42$, $p < .001$); a cough, without fever, which lasted at least three weeks ($t = 3.11$, $p < .01$); a sore throat or cold, with fever, lasting more than three days ($t = 2.45$, $p < .01$); and stomach flu, or virus with vomiting and diarrhea ($t = 2.24$, $p < .05$).

In summary, a similar pattern of results was found for all four strain measures. The high stress/poor cop[illegible]roup reported more

strain than any other group on each measure. In general, the high stress subjects reported greater strain than the low stress subjects. While good coping tended to have a moderating effect on strain for those high in stress, it seemed to have little impact for subjects reporting low stress. Finally, the measures of strain were relatively stable across time periods, except for acute physical symptoms, which showed a decline from Time 1 to Time 2.

Discussion

The present study investigated the relationship between stress, coping, and health. The goals of the study were to compare three approaches to the measurement of environmental stress and to assess the buffering effect of coping. The stressful environment in which this study took place was a work setting threatened with shutdown that was concurrently undergoing a reorganization of work assignments. Evidence that this situation was highly stressful can be drawn from the findings that, despite their relatively low life event stress and job hassles scores, the subjects in the present study reported elevated state anxiety, state anger and physical symptoms, and lower psychological well-being than the general population. Since the subjects in the present study also had relatively strong coping skills, and were about average in trait anxiety and trait anger, the high strain scores appear to reflect an acute reaction to environmental stress rather than a work force characterized by chronic adjustment problems.

Stress was assessed in the present study by a life event questionnaire, a job hassles scale, the amount of threat and frustration perceived in response to the work situation, and a composite stress index (CSI) based on these four stressor measures. The relationships between the CSI and each of the four strain measures, which ranged from .37 to .51 were stronger than any of the relationships among the single component stress measures and the strains, which varied between .09 and .36. The correlations between the CSI and the strains were also stronger than the correlations between similar strain measures and single stressor measures that have been reported in the literature, which typically vary between .20 and .30 (Rabkin & Struening, 1976). The relationships found in the present study between strain and the single stressor measures are quite comparable to those reported in the literature.

The expectation that greater strain would be associated with poorer coping was supported by the results of the present study. Poor copers, as measured by the Self-Control Schedule, reported significantly more strain than good copers on all four strain measures. These results were generally consistent with the findings in other investigations, in which coping was found to moderate stress reactions resulting from hurricane flooding (Anderson, 1976), a nuclear power accident (Collins, Baum, & Singer, 1983), severe illness (Felton, Hinrichson, Revenson & Efron, 1980; Weisman & Worden, 1976-77), job disruptions (Pearlin et al., 1981) and role conflicts (Dressler, 1980; Ilfeld, 1980; Menaghan,

1982; Pearlin & Schooler, 1978).

It was expected that coping skills would have a stronger buffering effect in the high stress group than in the low stress group. The pattern of means for all four strain measures supported this prediction. In addition, the Stress x Coping interaction was significant for state anxiety and GWB. For the other two strain measures, state anger and physical symptoms, the pattern of means was similar to the findings for state anxiety, but the Stress x Coping interaction was not statistically significant. In order to further test the hypothesis that the impact of coping on state anger and physical symptoms would be stronger for those reporting high levels of stress than those with low stress, differences between good and poor copers in the high and low stress groups, were evaluated by t-tests (see Tables 8 and 11). For persons reporting high levels of stress, poor copers scored higher on state anger ($t = 2.01$, $df = 54$, $p < .05$) and physical symptoms ($t = 2.33$, $df = 54$, $p < .05$) than good copers, whereas when stress was low, good and poor copers did not differ in state anger or physical symptoms. Thus, on each of the four dependent measures, good coping skills had a positive impact on health and well-being only for individuals experiencing high levels of stress. The findings of the present study, that good coping skills were more effective buffers of psychological strain for highly stressed individuals than for persons experiencing little or no stress, were consistent with results reported by Pearlin et al. (1981), who commented that coping skills appear to benefit those who are most in

need, i.e., those who are feeling overwhelmed and overburdened with demands from their environment.

While good copers in the high stress group were lower in state anger than poor copers, it is important to note that even the good coping group was very high in state anger, i.e., at about the 85th percentile when compared to national norms (Spielberger et al, 1979). The high state anger scores for subjects with good coping skills were surprising, considering the moderate level of trait anger of those subjects. The elevated state anger scores in the good coping group may be attributable to two factors: the high levels of frustration brought about by the work circumstances; and limitations of the coping measure.

The environmental stressors which the subjects were experiencing were reported to be quite frustrating. Spielberger and his colleagues (Spielberger, Jacobs, Russell & Crane, 1983; Spielberger, Pollans & Worden, 1983) have posited that frustrating circumstances are a powerful precursor to angry reactions, similar to the process put forth by Lazarus that threatening circumstances lead to anxiety (Lazarus, 1966;1980). Coping skills are thought to buffer the effects of stress on strains such as anger by enabling an individual to either modify an environmental stressor, to perceive the stressor in a more benign way or to better manage its emotional effects (Pearlin & Schooler, 1978). Since the subjects perceived their work situation as highly frustrating, and were powerless to change the conditions that evoked this frustration, the only coping option left was to palliate their

emotional reactions. While it appeared that coping skills were sufficient to do so with regard to anxiety, it may be speculated that the perceptions of frustration and feelings of anger in these subjects were so strong that even the good copers could not adequately attenuate them.

The Self-Control Schedule (SCS) used to measure coping skills in this study may not have adequately assessed the ability to cope with frustration and anger. Rosenbaum (1980) contends that the SCS was designed to assess the use of coping skills to "control emotional and physiological responses" (p. 110). However, the emotional responses that are considered in the SCS appear to be limited to anxiety and depression, e.g., "when I have to do something that is anxiety arousing for me, I try to visualize how I will overcome my anxieties while doing it"; "I often find it difficult to overcome my feelings of nervousness and tension without any outside help" (reverse scored); "when I am feeling depressed, I try to think about pleasant events"; and "when I am in a low mood, I try to act cheerful so my mood will change. In contrast, only one of the 36 SCS items mentions anger, and this item is concerned more with skills for adaptive behavior <u>while</u> one is angry than with the ability to handle the angry feelings themselves ("even when I am terribly angry at someone, I consider my actions carefully"). Thus, future measures of coping can improve on the SCS by adding items that assess adaptive methods for managing frustration and anger.

The composite stress index, comprised of several different classes of stressors was found to be a better predictor of strain than any of the stress measures that were based on only a single class of stress. In future investigations of the effects of environmental stress on illness, the combined influence of several classes of stressors should be examined.

Given the unique characteristics of the subjects in this study, the generalizability of the findings may be limited. Two-thirds of the subjects were female; the sample was highly educated in comparison to national norms; and of perhaps most importance, most of the subjects of the present study were mental health professionals. Considering their choice of occupation, it can be speculated that these subjects may have been more capable of recognizing their emotions and well-being, and/or less inhibited about admitting them than the general population. Nevertheless, the results of this study were generally consistent with results reported by other investigators.

The main findings of the present study can be summarized as follows. Subjects who experienced high levels of stress reported greater strain than those who were low in stress, as reflected in higher state anxiety, higher state anger, lower general well-being and more physical symptoms. However, good coping skills had a buffering effect on stress. That is, for highly stressed individuals, poor copers reported higher

state anxiety, state anger, and physical symptoms, and lower general well-being than good copers, whereas for persons experiencing little or no stress, coping had minimal impact.

To conclude, the present study has shown that stressors from a variety of life contexts can combine to have a strong impact on health and well-being. However, it has also demonstrated that adaptive coping behaviors can effectively moderate these stresses of life.

FOOTNOTES

1. This article is based on the author's doctoral dissertation submitted in partial fulfillment of the requirements for the Ph.D. in clinical/community psychology at the University of South Florida. Deep appreciation is expressed to Dr. Charles D. Spielberger for his insight in supervising this project. Correspondence should be addressed to Division of Research and Training, Florida Mental Health Institute, 13301 N. 30th Street, Tampa, FL 33612.

2. In order to be consistent with the other dependent measures, the state anger and anxiety scales from the STPI were slightly modified to assess the respective state over the past month.

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Table 1

Demographic Characteristics of Subjects

Total Subjects	139
males	45
females	94
Age	
mean	35.28
SD	9.89
Marital Status	
married	64
never married	37
divorced	33
widowed	3
separated	2
Education	
high school	20
trade or vocational	4
associate degree	24
Bachelor's degree	44
Master's degree	27
Doctorate degree	13
Medical degree	2
other	5
Years at this organization	
mean	3.19
SD	2.39

Table 2

Means, Standard Deviations and Alpha Coefficients for the Stressor and Coping Measures in This and Other Selected Studies

	Present Study (n = 139)	Other Study	t
Life Event Questionnaire		127 working adults (Kale & Stenmark, 1983)	
mean	196.56	256.09	3.23**
SD	152.97	146.49	
alpha	.63	a	
Job-Related Tension Index		228 engineers and accountants (Burke, 1976)	
mean	22.43	26.2	
SD	5.44	a	
alpha	.74	a	
Threat			
mean	2.94	comparative study	
SD	1.45	not available	
Frustration			
mean	3.54	comparative study	
SD	1.56	not available	
Self Control Schedule		105 Israeli adults (Rosenbaum, 1980)	
mean	42.49	31.30	3.97***
SD	20.37	23.20	
alpha	.80	.80	

[a] not reported

*
**$p < .05$
***$p < .01$
$p < .001$

Table 3

Means, Standard Deviations and Alpha Coefficients
for the Strain Measures in This and Other Selected Studies

Outcome Measure	Present Study	Other Study	t [a]
Trait Anxiety		584 working adults (Spielberger et al., 1979)	
mean	16.86	16.27 - 18.08	.66
SD	4.82	4.70 - 5.45	
alpha	.86	.88 - .92	
Trait Anger		584 working adults (Spielberger et al., 1979)	
mean	17.83	17.41 - 18.49	.27
SD	3.76	4.51 - 5.19	
alpha	.72	.88 - .91	
State Anxiety		584 working adults (Spielberger et al., 1979)	
mean	20.53	16.89 - 18.68	4.68***
SD	6.39	5.49 - 6.84	
alpha	.90	.91 - .94	
State Anger		584 working adults (Spielberger et al., 1979)	
mean	18.70	13.29 - 14.28	9.04***
SD	6.79	4.93 - 6.03	
alpha	.94	.93 - .94	
General Well-Being		6931 U.S. adults (Dupuy, 1978)	
mean	73.08	80.40	4.91***
SD	17.29	17.40	
alpha	.92	.93	
Physical Symptoms			
mean	3.96	comparative study	
SD	3.06	not available	
alpha	.71		

[a] where a range of comparison scores exists, the midpoint of the range was used in conducting the *t*-tests.

*$p < .05$
**$p < .01$
***$p < .001$

Table 4

Comparison of Subjects who Dropped Out of the Study after Time 1 with those Who Completed the Study

Measure	Dropped-out (n=25) mean	SD	Completed (n=114) mean	SD	t
Life Event Stress	187.83	140.78	203.70	154.52	.49
Job Stress	24.39	5.43	22.20	4.50	1.85
Threat	2.75	1.45	2.98	1.45	.71
Frustration	3.17	1.55	3.63	1.55	1.31
Coping	38.64	20.03	43.72	20.11	1.14
Trait Anxiety	18.84	3.41	17.60	3.82	1.49
Trait Anger	17.88	4.58	16.63	4.86	1.22
State Anxiety	22.40	5.82	20.12	6.46	1.74
State Anger	19.72	7.68	18.48	6.59	.74
General Well-Being	68.87	15.52	74.01	17.59	1.46
Physical Symptoms	5.00	3.27	3.70	2.98	1.83

Table 5

Pearson Product Moment Correlations Between

Various Classes of Environmental Stress and Four Measures of Strain

Stress Measures	State Anxiety	State Anger	General Well-Being	Physical Symptoms
Life Events Questionnaire	.32*	.12	-.36*	.31*
Job-Related Tension Index	.34*	.19*	-.31*	.29*
Perceived Threat	.24*	.24*	-.15	.09
Perceived Frustration	.34*	.34*	-.32*	.27*
Composite Stressor Index	.51*	.37*	-.46*	.37*

* $p < .05$

Table 6

State Anxiety Scores for those High and Low in Stress and Coping

		COPING			
		Poor		Good	
		Time 1	Time 2	Time 1	Time 2
STRESS					
HIGH					
	mean	25.24	22.86	19.19	19.85
	SD	6.58	5.35	5.68	7.97
	n	29	29	27	27
LOW					
	mean	17.82	17.21	17.68	16.75
	SD	5.52	4.17	4.85	4.84
	n	28	28	28	28

Table 7

Summary of the Analysis of State Anxiety and State Anger at Time Periods 1 and 2 as a function of Stress and Coping

		State Anxiety		State Anger	
Source	df	MS	F	MS	F
Stress	1	1092.87	20.29***	722.68	11.25***
Coping	1	327.31	6.08**	273.96	4.26*
Str x Cop	1	250.30	4.65*	134.77	2.10
Error (betw)	108	53.86		64.25	
Time Periods	1	36.91	3.19	8.58	0.49
Time x Str	1	0.11	0.01	0.02	0.00
Time x Cop	1	25.96	2.24	12.65	0.73
Time x Str x Cop	1	39.66	3.43	20.18	1.16
Error (within)	108	11.57		17.39	

*$p < .05$

**$p < .01$

***$p < .001$

Table 8

State Anger Scores for those High and Low in Stress and Coping

		COPING			
		Poor		Good	
		Time 1	Time 2	Time 1	Time 2
STRESS					
HIGH					
	mean	22.66	21.21	17.81	18.52
	SD	7.58	7.09	7.44	8.77
	n	29	29	27	27
LOW					
	mean	16.93	16.64	16.39	15.85
	SD	4.43	4.05	4.69	5.42
	n	28	28	28	28

Table 9

General Well-Being Scores for those High and Low in Stress and Coping

		COPING			
		Poor		Good	
		Time 1	Time 2	Time 1	Time 2
STRESS					
HIGH					
	mean	59.85	65.28	76.07	74.93
	SD	15.93	16.24	15.49	20.79
	n	29	29	27	27
LOW					
	mean	80.25	81.54	80.72	81.64
	SD	16.95	16.47	13.88	15.75
	n	28	28	28	28

Table 10

Summary of the Analysis of General Well-Being and Acute Physical Symptoms at Time Periods 1 and 2 as a function of Stress and Coping

		General Well-Being		Acute Physical Symptoms	
Source	df	MS	F	MS	F
Stress	1	8067.39	17.67***	128.78	11.59***
Coping	1	2446.23	5.36*	48.16	4.34*
Str x Cop	1	2240.11	4.91*	21.80	1.96
Error (betw)	108	456.55		11.11	
Time Periods	1	147.61	1.65	14.56	5.73**
Time x Str	1	14.89	0.17	6.83	2.69
Time x Cop	1	166.44	1.89	0.79	0.31
Time x Str x Cop	1	135.01	1.51	1.92	0.75
Error (within)	108	89.26		2.54	

*$p < .05$

**$p < .01$

***$p < .001$

Table 11

Physical Symptom Scores for those High and Low in Stress and Coping

	COPING			
	Poor		Good	
	Time 1	Time 2	Time 1	Time 2
HIGH				
mean	5.45	4.66	3.96	3.04
SD	3.07	2.24	2.72	2.81
n	29	29	27	27
STRESS				
LOW				
mean	3.14	2.68	2.54	2.68
SD	3.10	1.83	2.22	2.65
n	28	28	28	28

Table 12

Intercorrelation Matrix of the Variables
included in the Path Analyses

		1	2	3	4	5	6	7	8	9
1.	Trait Anxiety	---								
2.	Trait Anger	.43*	---							
3.	Threat	.20*	.20*	---						
4.	Frustration	.29*	.20*	.60*	---					
5.	Coping	-.39*	-.21*	-.14	-.24*	---				
6.	State Anxiety	.73*	.39*	.24*	.34*	-.28*	---			
7.	State Anger	.34*	.36*	.24*	.34*	-.27*	.55*	---		
8.	Gen. Well-Being	-.63*	-.28*	-.15	-.32*	.29*	-.75*	-.45*	---	
9.	Phys. Symptoms	.39*	.24*	.09	.27*	-.20*	.51*	.31*	-.62*	---
		1	2	3	4	5	6	7	8	9

*$p < .05$

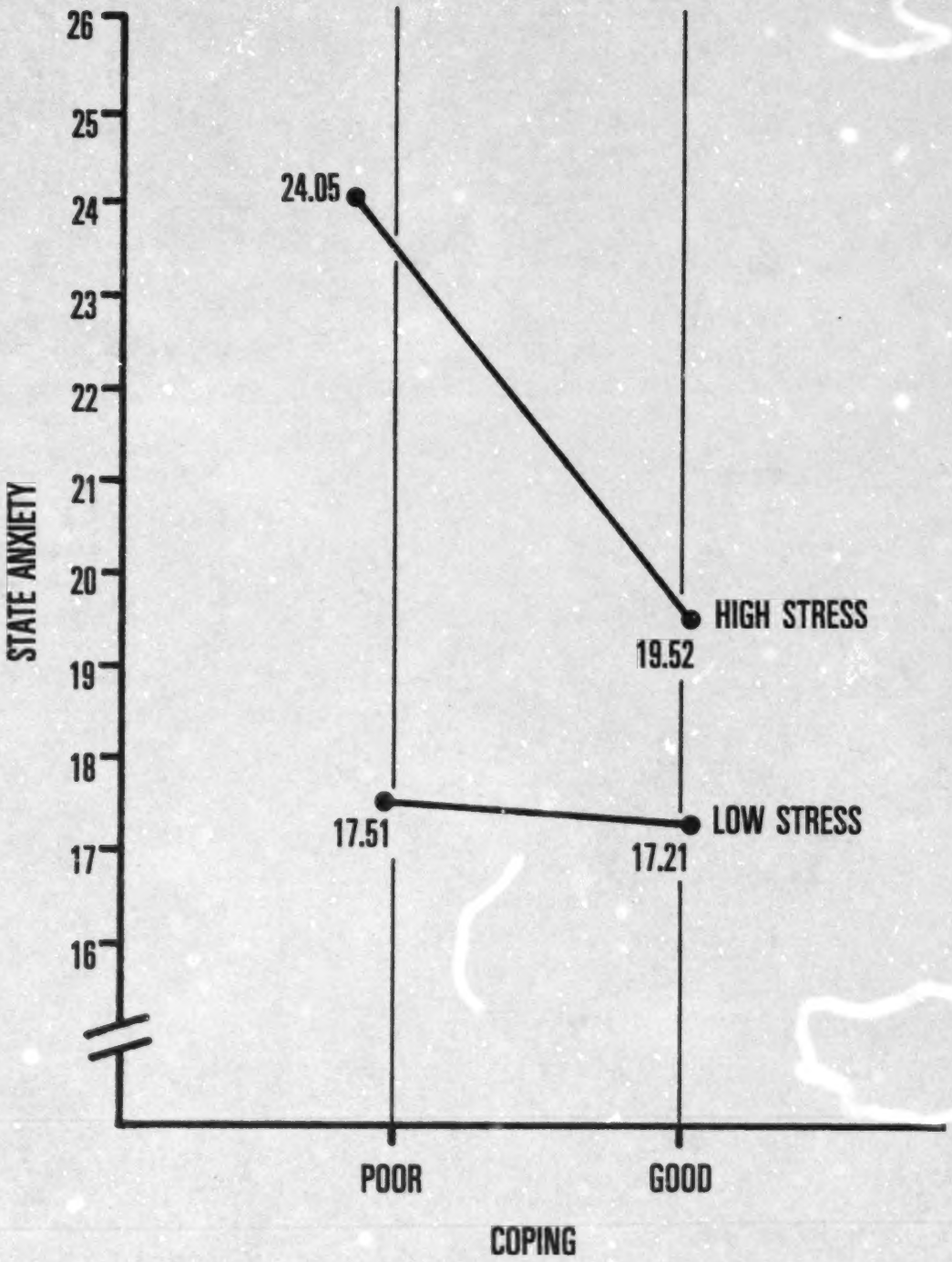

FIGURE 1. THE INTERACTION OF STRESS AND COPING ON STATE ANXIETY

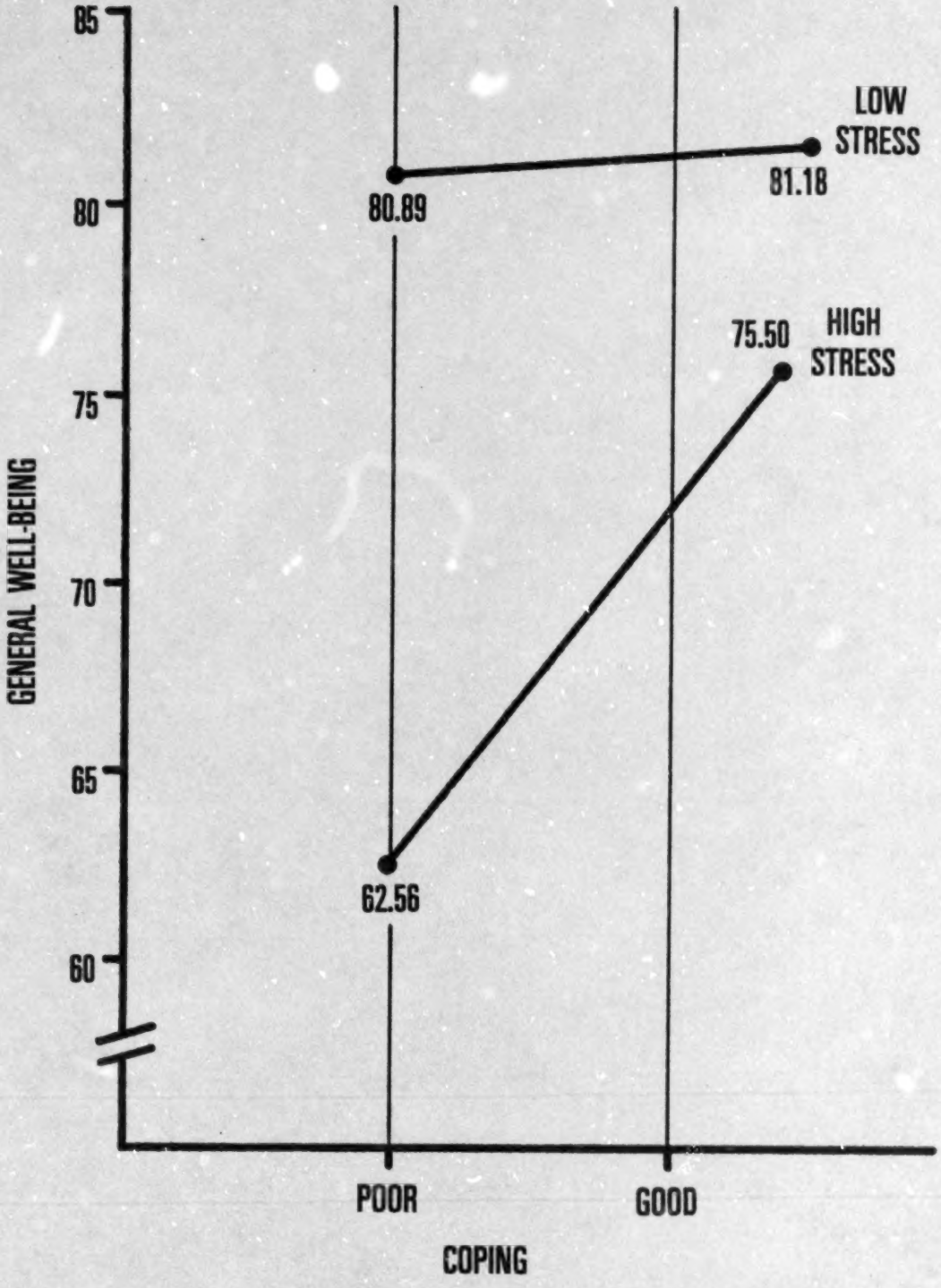

FIGURE 2. THE INTERACTION OF STRESS AND COPING ON GENERAL WELL-BEING.